

WHAT IS CLAIMED IS:

1. An encoder, comprising:
  - a constellation generator, responsive to an input bitstream to produce an impulse comprising an in-phase component and a quadrature
  - 5 component, said impulse defining symbols within a constellation of symbols;
  - a pair of vector arithmetic structures (VAS), each VAS adapting a respective one of said in-phase and quadrature components to produce respective shaped in-phase and quadrature components; and
  - a combiner, for combining said shaped in-phase and quadrature
  - 10 components to produce an encoded bitstream.
2. The encoder of claim 1, wherein each VAS comprises:
  - a plurality of vector registers (VR) for storing precomputed pulse
  - 15 shaping values; and
  - a vector arithmetic unit (VAU) for arithmetically processing a selected vector and an accumulated vector, said selected vector comprising a plurality of pre-computed values selected from said vector registers in response to a received component signal.
- 20 3. The encoder of claim 2, wherein said output vector produced by said VAU is stored in an output buffer.
4. The encoder of claim 3, wherein said output vector produced by said VAU is stored in a vector accumulator (VA) for subsequent arithmetic
- 25 processing.
5. The encoder of claim 4, wherein said VAU performs an addition operation in response to said received component signal having a most significant bit (MSB) of a first state, and a subtraction operation in response to
- 30 said received component signal having a MSB of a second state.
6. The encoder of claim 1, wherein said constellation of symbols

comprise carrierless amplitude and phase (CAP) symbols.

7. The encoder of claim 1, wherein said constellation of symbols  
comprise quadrature amplitude modulation (QAM) encoded symbols.

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8. The encoder of claim 1, wherein each VAS processes a received  
component signal in a manner avoiding a multiplication operation.

9. The encoder of claim 1, wherein each VAS processes a received  
10 component signal in a manner implementing a filtering operation.

10. A encoding method, comprising:  
processing an input bitstream to produce an impulse defining symbols  
within a constellation of symbols; and  
15 shaping, using a vector arithmetic structure (VAS), said component to  
produce a shaped component.

11. The method of claim 10, wherein said step of shaping comprises:  
arithmetically processing a precomputed vector and an accumulated  
20 vector in response to each received symbol, said precomputed vectors being  
selected to impart a desired shape to said received component.

12. The method of claim 11, wherein said arithmetically processed  
component is added to a vector accumulator for subsequent arithmetic  
25 processing.

13. The method of claim 12, wherein said arithmetic processing  
comprises an addition operation in response to said received component  
having a most significant bit (MSB) of a first state, and a subtraction operation  
30 in response to said received component having an MSB of a second state.

14. The method of claim 10, wherein said constellation of symbols  
comprises pulse code modulated (PCM) symbols.

15. The method of claim 10, wherein said impulse comprises an in-phase component and a quadrature component; and
- said step of shaping comprises the steps of arithmetically processing
- 5 each of said in-phase and quadrature components using respective vector arithmetic structures (VAS) to produce respective shaped in-phase and quadrature components.
16. The method of claim 15, further comprising the step of:
- 10 combining said shaped in-phase and quadrature components to produce an encoded bitstream.

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